

CLAIMS:

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1. A transport assembly for moving an object, comprising:
sensor units and actuator units arranged on the transport assembly; said
sensor units for providing positional information of the object; said actuator units
5 for moving the object relative to the transport assembly;
local computational agents ⁷⁰ coupled said sensor units and said actuator
units; each of said computational agents accumulating sensor information from a
spatially localized grouping of sensor units; and
a global controller, coupled to said local computational agents, for
10 receiving aggregate operating characteristics from, and delivering global
constraints to, said local computational agents; said local computational agents
using the global constraints and the sensor information to determine adjustments
to said actuator units to move the object along the transport assembly.

15 2. The transport assembly according to claim 1, further comprising a
lookup table for communicating the global constraints to said local computational
agents.

20 3. The transport assembly according to claim 1, further comprising a filter
unit for computing the aggregate operating characteristics after receiving the
sensor information from the local computational units.

4. The transport assembly according to claim 1, wherein said global controller receives the aggregate operating characteristics over a first operating interval.

5. The transport assembly according to claim 4, wherein said global controller delivers the global constraints over a second operating interval.

6. The transport assembly according to claim 5, wherein the second operating interval is longer than the first operating interval.

[Signature] 7. The transport assembly according to claim 1, wherein neighboring ones of said sensor units and said actuator units are coupled to computational agents
10 that communicate directly with each other.

8. The transport assembly according to claim 1, wherein said actuator units are spatially proximate to each other and ones of said sensor units.

9. The transport assembly according to claim 1, wherein said local computational agents compute a global response using the global constraints.

15 10. The transport assembly according to claim 9, wherein said local computational agents compute a local response with the sensor information.

11. The transport assembly according to claim 10, wherein said local computational agents determine adjustments to said actuator units with a desired actuator response computed using the global response and the local
20 response.

12. The transport assembly according to claim 11, wherein said local computational agents rank the global response and the local response in importance using weights.
13. The transport assembly according to claim 12, wherein said local computational agents adaptively determine values for the weights.
14. The transport assembly according to claim 1, wherein said local computational agents and said global controller are organized hierarchically.

15. In a transport assembly having sensors, actuators and a controller, the controller having computational agents and a global controller for controlling movement of an object on the transport assembly, a method for operating the computational agents, comprising the steps of:

5 (a) computing a local actuator response for accumulated sensor information from a spatially localized grouping of sensors;

(b) computing a global actuator response for detected global constraints from the global controller;

(c) computing a desired actuator response for minimizing differences

10 between the computed local actuator response and the computed global actuator response; and

(d) applying the desired actuator response to a spatially localized grouping of actuator units.

16. The method according to claim 15, further comprising the step of

15 modifying the desired actuator response to compensate for malfunctioning actuators.

17. The method according to claim 16, wherein said modifying step compares the desired actuator responses of computational agents coupled to spatially localized groupings of sensors and actuators.

20 18. The method according to claim 16, wherein said modifying step compares the local actuator response of computational agents coupled to spatially localized groupings of sensors and actuators.

19. The method according to claim 16, further comprising the step of determining whether spatially localized groupings of sensor and actuator units function properly.

20. The method according to claim 16, wherein said step (c) further
5 comprises the step of retrieving the global constraints from a lookup table.

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